

Simulation Patient Design (September, 2020)

Case of Unknown Placenta Accreta Spectrum during a Cesarean Delivery

Authors: Benjamin Hyers, MD, Daniel Katz, MD, Icahn School of Medicine at Mount Sinai

Editors: Sonal Zambare, MD, Gillian Abir, MBChB

Introduction

Placenta accreta spectrum (PAS) is a broad term that includes placenta accreta, increta, and percreta. It occurs when there is abnormal trophoblast invasion that can either attach, invade, or penetrate through the myometrium of the uterine wall respectively.¹ This is of extreme clinical importance because after delivery of the fetus, the adherent placenta can result in massive hemorrhage that can be life threatening to the mother.

The incidence of PAS is increasing because the number of patients undergoing cesarean delivery (CD) is increasing. The most common risk factor for developing PAS is a previous CD and the risk increases with each additional CD. A systemic review showed the risk increased from 0.3% with one prior CD to 6.74% with 5 or more prior CDs.² Placenta previa is also a major risk factor for invasive placental disease. A large prospective observational study showed the risk of placenta accreta with the presence of placenta previa was 3% for the first CD and increased to 40% or more for the third CD.³ Other risk factors for PAS include advanced maternal age, multiparity, prior uterine surgeries, and Asherman syndrome.¹

The diagnosis of PAS can be made using ultrasound or magnetic resonance imaging (MRI) usually in the second or third trimester. Sensitivity and specificity data widely range for these modalities and are determined by specific radiographic findings. The most reliable diagnostic ultrasound findings are placental lacunae and disruption of the interface between the bladder and uterine walls.⁴ In a meta-analysis, sensitivity of lacunae for identifying placenta accreta, increta, and percreta was approximately 75, 89, and 76%, and specificity was approximately 97, 98, and 99% respectively.⁵ In a 2018 systematic review and meta-analysis, sensitivity of MRI to detect placenta accreta, increta and percreta was approximately 94, 100, and 87%, and specificity was approximately 99, 97, and 97% respectively.⁶

Antenatal diagnosis of PAS provides an opportunity for the multidisciplinary obstetric team to plan where the most appropriate location for delivery should be for optimal maternal and fetal/neonatal safety (e.g. at a level III or IV maternal care facility).⁷ When a case of PAS is unknown and only diagnosed at the time of delivery (either intra-operatively during a CD, or after a vaginal delivery), the obstetric care team needs to work together quickly and efficiently to resuscitate the patient. Unknown cases of PAS have high morbidity and mortality due to massive hemorrhage, especially in an unprepared setting.¹

Educational Rationale: To teach team skills in recognizing and correctly managing an antepartum and/or postpartum hemorrhage in a patient with unknown PAS

Target Audiences: Anesthesiologists, Obstetricians, Resident Physicians, L&D nurses, L&D support personnel, and medical students

Learning Objectives: As per Accreditation Council for Graduate Medical Education (ACGME) Core Competencies

Upon completion of this simulation (including the debrief) learners will be able to:

- *Medical knowledge:* Explain the common signs, symptoms, and treatment of unknown PAS
- *Patient care:* Ask appropriate preoperative questions to identify risk factors that predispose a patient to PAS, and effectively manage hemorrhage, modify the anesthetic plan and optimize post-operative care
- *Practice-based learning and improvement:* Effectively implement an interdisciplinary emergency response and identify all necessary skills and equipment needed to correctly manage a patient with unknown PAS
- *Interpersonal and communication skills:* Utilize closed-loop communication with the surgical team, nursing team, and the blood transfusion service, and identify a team leader to ensure the safety of the patient and her infant
- *Professionalism:* Demonstrate compassion to the patient and her partner, and demonstrate mutual respect for each team member involved in the patient's care
- *Systems-based practice:* Identify the location of all emergency airway equipment, rapid infusers, and code carts, and understand existing barriers within the system such as shortage of equipment, personnel, knowledge gaps, and institutional protocols

Questions to Ask After the Scenario:

1. How quickly was an emergency response initiated?
2. Was a team leader identified and other roles clearly delegated and established?
3. Was closed-loop communication utilized?
4. Was the location of the rapid infuser known, and was it used correctly?
5. Was a massive transfusion protocol in place?
6. Was compassion shown to the patient and her partner when the emergency response was initiated and also when the unanticipated hysterectomy was explained, including the implications?
7. If the diagnosis of PAS had of been made antenatally, what would have been different?

Assessment Instruments:

1. Learner Knowledge Assessment form (Appendix 1)
2. Simulation Activity Evaluation form (Appendix 2)

Equipment Needed and Set-up:

In-situ OR set-up

- Mannequin on OR table with left uterine displacement, prepped and draped for CD
- 18 gauge IV in left antecubital fossa
- Blood pressure cuff, EKG leads, pulse oximeter, and oxygen (nasal cannula) on mannequin

Needed but not necessarily in OR

- Rapid infuser
- Airway equipment
- Invasive blood pressure equipment

Simulation Scenario Set-up:

The case

Ms. Jane Smith is a 35 year old G2P1 presenting for a scheduled CD at 39 weeks 4 days. She has had an uncomplicated pregnancy and her only past medical history is mild intermittent asthma for which she has never been intubated and rarely needs her albuterol inhaler. Her surgical history includes one uncomplicated CD 3 years ago with spinal anesthesia. Her type and screen is antibody negative and baseline hematocrit is 38%. Your colleague consented the patient for a spinal anesthetic and started the case. You relieve him/her shortly after the spinal has been placed and prophylactic antibiotics have been administered.

Simulation Pre-brief

- Read the scenario and instruct team members on their roles during the simulation
- Learners take their places at the head of the bed in the OR
- The circulator nurse, neonatal nurse, scrub tech, and surgeon are in their appropriate places
- Simulation driver plays the voice of the patient
- Confederate plays the partner

Scenario Details

Trigger	Patient Condition	Action	Done	Time	Comments
Time out performed per institutional protocol Partner is present	Patient on OR table with spinal anesthesia Left uterine displacement	<ol style="list-style-type: none"> 1. Surgeon confirms adequate anesthesia using an Allis clamp 2. Skin incision is made 			
Baby delivered Surgeons call for help with removal of the placenta	Patient (+ partner) appear anxious Vitals stable	<ol style="list-style-type: none"> 1. Oxytocin bolus + infusion administered post-delivery 2. Communicate with surgeon when they call for help <ul style="list-style-type: none"> <input type="checkbox"/> What is the problem? <input type="checkbox"/> How much bleeding is there? 3. Communicate with patient + partner <ul style="list-style-type: none"> <input type="checkbox"/> Show compassion <input type="checkbox"/> Explain what is happening + explain that keeping her safe is the priority 			
Surgeons continue to struggle with placental removal	Patient (+ partner) extremely anxious	<ol style="list-style-type: none"> 1. Establish an emergency response <ul style="list-style-type: none"> <input type="checkbox"/> Call for help, alert other anesthesiologists <input type="checkbox"/> Alert surgeons to unstable vitals 			

<p>(placenta appears 'stuck')</p> <p>Brisk bleeding present</p>	<p>Patient is light-headed and nauseous</p> <p>Unstable vitals (MAP starts to decrease)</p>	<ul style="list-style-type: none"> <input type="checkbox"/> Order MTP 2. Administer oxygen (10 L/min via face mask) 3. Nurse to escort partner out of OR <ul style="list-style-type: none"> <input type="checkbox"/> Explain what is happening + ensure excellent care 4. Treat unstable vitals <ul style="list-style-type: none"> <input type="checkbox"/> Administer fluid + vasopressors while waiting for blood 5. Obtain additional IV access <ul style="list-style-type: none"> <input type="checkbox"/> Large bore IVs (14-16g/RIC line) <input type="checkbox"/> Send labs (CBC, coag screen, ABG, lactate, TEG) <input type="checkbox"/> Set up rapid infuser 6. Invasive monitoring <ul style="list-style-type: none"> <input type="checkbox"/> Place arterial line 			
<p>Surgeons unable to remove placenta, uterus packed</p> <p>Suction container full + lap pads soaked with blood</p>	<p>Vitals do not improve</p> <p>Patient becomes lethargic + unable to follow commands</p>	<ol style="list-style-type: none"> 1. Transfuse blood products <ul style="list-style-type: none"> <input type="checkbox"/> Consider synthetic fibrinogen (e.g. RiaSTAP) <input type="checkbox"/> Administer calcium replacement 2. Convert to general anesthesia <ul style="list-style-type: none"> <input type="checkbox"/> RSI + intubation with cricoid pressure 3. Continue to treat refractory hypotension 4. Consider antifibrinolytic (e.g. tranexamic acid) 5. Is uterine artery embolization by IR a possible treatment option for this patient? 6. Suggest emergent hysterectomy 			
<p>Emergent hysterectomy performed</p> <p>Bleeding ceases</p>	<p>Blood pressure slowly improves + patient stabilizes</p>	<ol style="list-style-type: none"> 1. Continue to support hemodynamics <ul style="list-style-type: none"> <input type="checkbox"/> Blood products <input type="checkbox"/> Pressers PRN 2. Repeat labs 3. Actively warm patient + monitor core temperature 4. Monitor urine output 5. After patient stabilizes, discuss postoperative care <ul style="list-style-type: none"> <input type="checkbox"/> To remain intubated <input type="checkbox"/> Refer to ICU 			

Update partner		<ol style="list-style-type: none">1. Be compassionate + considerate when informing partner of life-saving interventions2. Update re neonatal status			
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Appendix 1

Learner Knowledge Assessment Labor and Delivery Multidisciplinary Team Simulation

Name of simulation: _____

Date: _____

OB Nursing Anes

Each item has two components. The “Before the simulation” column (left side) examines your perspective at the beginning of the simulation. The “End of Simulation” column (right side) is to evaluate your perspective at the completion of the simulation.

1. How would you rate your knowledge of the management of unknown PAS?

BEFORE THE SIMULATION							END OF SIMULATION						
1	2	3	4	5	6	7	1	2	3	4	5	6	7
Little/none					Knowledgeable		Little/none					Knowledgeable	

2. How would you rate your knowledge of the risk factors that predispose patients to PAS?

BEFORE THE SIMULATION							END OF SIMULATION						
1	2	3	4	5	6	7	1	2	3	4	5	6	7
Little/none					Knowledgeable		Little/none					Knowledgeable	

3. How would you rate your knowledge of the location of the nearest rapid infuser?

BEFORE THE SIMULATION							END OF SIMULATION						
1	2	3	4	5	6	7	1	2	3	4	5	6	7
Little/none					Knowledgeable		Little/none					Knowledgeable	

4. How would you rate your knowledge of how to operate the rapid infuser?

BEFORE THE SIMULATION							END OF SIMULATION						
1	2	3	4	5	6	7	1	2	3	4	5	6	7
Little/none					Knowledgeable		Little/none					Knowledgeable	

5. How would you rate your knowledge of how to order, when to use, and the content of the massive transfusion protocol?

BEFORE THE SIMULATION							END OF SIMULATION						
1	2	3	4	5	6	7	1	2	3	4	5	6	7
Little/none					Knowledgeable		Little/none					Knowledgeable	

Appendix 2

Simulation Activity Evaluation

DATE OF SIMULATION: _____

OCCUPATION: Consultant PG Yr 1 2 3 4 STUDENT NURSE MIDWIFE OTHER

SPECIALTY: _____ YEARS IN PRACTICE: _____

Please rate the following aspects of this training program using the scale listed below:

1 = Poor 2 = Suboptimal 3 = Adequate 4 = Good 5 = Excellent

Use "N/A" if you did not experience or otherwise cannot rate an item

INTRODUCTORY MATERIALS

Orientation to the simulator	1	2	3	4	5	N/A
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PHYSICAL SPACE

Realism of the simulator space	1	2	3	4	5	N/A
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EQUIPMENT

Satisfaction with the mannequin	1	2	3	4	5	N/A
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SCENARIOS

Realism of the scenarios	1	2	3	4	5	N/A
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Ability of the scenarios to test technical skills	1	2	3	4	5	N/A
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Ability of the scenarios to test behavioral skills	1	2	3	4	5	N/A
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Overall quality of the debriefings	1	2	3	4	5	N/A
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DID YOU FIND THIS USEFUL?

To improve your clinical practice?	1	2	3	4	5	N/A
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To improve your teamwork skills?	1	2	3	4	5	N/A
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To improve your VERBAL communication?	1	2	3	4	5	N/A
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To improve your NONVERBAL communication?	1	2	3	4	5	N/A
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FACULTY

Quality of instructors	1	2	3	4	5	N/A
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Simulation as a teaching method	1	2	3	4	5	N/A
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COMMENTS/SUGGESTIONS:

References

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